[Document Name] Specification

[Title of the Invention] ENGINE UNIT MOUNTING STRUCTURE FOR ALL-TERRAIN VEHICLE

[Claims]

[Claim 1] An engine unit mounting structure for an all-terrain vehicle having wheels for running on the rough ground arranged at respective right and left sides of front and rear portions of a body frame, and a seat for two riders arranged at a generally center portion of the body frame in a fore to aft direction, wherein an engine unit has an engine including a cylinder block and a cylinder head, and a transmission case enclosing a transmission, and the engine unit is mounted onto the body frame such that an output shaft of the transmission is positioned in front of a crankshaft in a fore to aft direction of the vehicle, and the crankshaft and the output shaft are placed below the seat.

[Claim 2] The engine unit mounting structure for an all-terrain vehicle according to Claim 1, wherein at least a portion of the engine is positioned rearward than the rear edge of the seat and inclines upward.

[Claim 3] The engine unit mounting structure for an all-terrain vehicle according to Claim 2, wherein the seat is divided into right and left pieces, the engine is centrally positioned in a transverse direction relative to the vehicle body, and an intake system extends from the front portion of the vehicle along between the right and left seat pieces and is connected to a front wall of the cylinder head relative to the vehicle body, while an exhaust system extends rearward relative to the vehicle body and is connected to a rear wall of the cylinder head.

[Claim 4] The engine unit mounting structure for an all-terrain vehicle according to Claim 3, wherein a fuel supply device connected to the front wall of the cylinder head is positioned between the right and left seat pieces, and an intake duct connected to the fuel supply device extends between the right and left seat pieces and is connected to an air cleaner.

[Claim 5] The engine unit mounting structure for an all-terrain vehicle according to Claim 3, wherein a shift lever is disposed between the right and left seat pieces so as to be positioned above and in the proximity of the transmission case of the engine unit.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

This invention relates to an engine unit mounting structure for an all-terrain vehicle.

[0002]

[Prior Art]

Generally, four-wheeled vehicles of this kind for running on the rough ground have wheels, each of which mounts a balloon tire, arranged at respective right and left sides of front and rear portions of a frame. The vehicles also have a seat for two riders arranged at a generally center portion of the frame and an engine unit disposed below the seat.

[0003]

In such a conventional engine unit mounting structure, the engine unit is generally positioned below and behind the seat, with the engine including a cylinder head and a cylinder block, oriented to the front side of the vehicle (for example, see Patent Document 1).

[0004]

[Patent Document 1]

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[0005]

[Problems to be Solved by the Invention]

Such a vehicle that has the engine unit mounted in the rear portion of the vehicle as conventionally constructed can prevent a problem that the engine unit interferes with the seat and riders' feet. This, however, causes the rear wheels to be positioned further rearward, which requires extending the wheelbase, resulting in a problem that the vehicle body can be larger.

[0006]

When the engine is located in the region below the seat, at the front side, to avoid the foregoing problem, a problem arises that the riders interfere with the cylinder head of the engine, and the influence of engine heat makes it difficult for the riders to directly change seats between right and left seat pieces.

[0007]

This invention has been made to solve the above problems. It is therefore an object of the invention to provide an engine unit mounting structure for an all-terrain vehicle capable of mounting the engine unit without expanding the wheelbase, which can prevent the vehicle body from becoming larger, and allowing riders to directly change seats between right and left seat pieces.

[0008]

[Means for Solving the Problems]

The invention of Claim 1 is characterized by an engine unit

mounting structure for an all-terrain vehicle having wheels for running on the rough ground arranged at respective right and left sides of front and rear portions of a body frame, and a seat for two riders arranged at a generally center portion of the body frame in a fore to aft direction, in which an engine unit has an engine including a cylinder block and a cylinder head, and a transmission case enclosing a transmission, and the engine unit is mounted onto the body frame such that an output shaft of the transmission is positioned in front of a crankshaft in a fore to aft direction of the vehicle, and the crankshaft and the output shaft are placed below the seat.

[0009]

The invention of Claim 2 is characterized by the engine unit mounting structure for an all-terrain vehicle according to Claim 1, in which at least a portion of the engine is positioned rearward than the rear edge of the seat and inclines upward.

[0010]

The invention of Claim 3 is characterized by the engine unit mounting structure for an all-terrain vehicle according to Claim 2, in which the seat is divided into right and left pieces, the engine is centrally positioned in a transverse direction relative to the vehicle body, and an intake system extends from a front portion of the vehicle along between the right and left seat pieces and is connected to a front wall of the cylinder head relative to the vehicle body, while an exhaust system extends rearward relative to the vehicle body and is connected to a rear wall of the cylinder head.

[0011]

The invention of Claim 4 is characterized by the engine unit mounting structure for an all-terrain vehicle according to

Claim 3, in which a fuel supply device connected to the front wall of the cylinder head is positioned between the right and left seat pieces, and an intake duct connected to the fuel supply device extends between the right and left seat pieces and is connected to an air cleaner.

[0012]

The invention of Claim 5 is characterized by the engine unit mounting structure for an all-terrain vehicle according to Claim 3, in which a shift lever is disposed between the right and left seat pieces so as to be positioned above and in the proximity of the transmission case of the engine unit.

[0013]

[Effect of the Invention]

According to the engine unit mounting structure of the invention described in Claim 1, the engine unit is mounted below the seat such that the output shaft of the transmission is positioned in front of the crankshaft relative to the vehicle body. Therefore, the engine is inevitably directed rearward, and the transmission case is positioned below the seat. The engine unit thus can be mounted with a small rearward protrusion of the engine unit without interfering with the seat or riders' feet. As a result, the wheelbase can be shortened, and thereby the vehicle body can be compact.

[0014]

Also, since the engine including the cylinder head is directed rearward, the engine is inhibited from interfering with the riders, and also the engine heat is inhibited from affecting the riders. Hence, the riders can easily directly change seats between the right and left seat pieces.

[0015]

According to the invention of Claim 2, at least a portion of the engine is positioned rearward than the rear edge of the seat and inclines upward. This prevents more reliably the interference of the cylinder block and the cylinder head with the seat and the riders, and the influence of the engine heat on the riders.

[0016]

According to the invention of Claim 3, the intake system extends between the right and left seat pieces and is connected to the front wall of the cylinder head. Therefore, the engine heat is prevented from affecting the intake system, and thus a stable engine output can be assured. Also, the exhaust system extends rearward relative to the vehicle body and is connected to the rear wall of the cylinder head. Therefore, the heat of the exhaust gases can be discharged rearward, and the exhaust system can be spaced apart from the fuel supply system. In these standpoints, the influence of the engine heat on an engine output can be prevented.

[0017]

According to the invention of Claim 4, the fuel supply device is positioned between the right and left seat pieces, and the intake duct connecting the fuel supply device to the air cleaner extends between the right and left seat pieces. This allows using the empty space between the right and left seat pieces to dispose the intake system in a compact manner.

[0018]

According to the invention of Claim 5, the shift lever is positioned above and in the proximity of the transmission case between the right and left seat pieces. Therefore, the distance between the shift lever and the transmission can be

shortened, the linkage mechanism that connects both the shift lever and the transmission can be compact, and the structure thereof can be simple. Further, the operation feeling of the shift lever can be improved.

[0019]

[Embodiment of the Invention]

An embodiment of the present invention is described with reference to the attached figures.

[0020]

FIGs. 1 to 6 illustrate an engine mounting structure for an all-terrain vehicle constructed in accordance with an embodiment of the present invention. FIGs. 1 and 2 are side and top plan views of the all-terrain vehicle, respectively. FIG. 3 is a side view of the vehicle that mounts an engine unit. FIG.4 is a side view of a front differential to which a gear box is affixed. FIG. 5 is a cross-sectional rear view of a floor tunnel portion of a floor panel. FIG. 6 is a cross-sectional view of a carrier. Additionally, the terms "right," "left," "front" and "rear" mean right, left, front and rear sides which are defined when a rider is seated in the seat.

[0021]

In the figures, reference numeral 1 indicates an all-terrain vehicle. The vehicle 1 has front and rear wheels 3, 4 that mount balloon tires for running on the rough ground on each right front, left front, right rear and left rear end of a body frame 2. The vehicle 1 has a seat 5 for two riders arranged at a generally center portion of the body frame 2 in a fore to aft direction. The seat 5 is divided into right and left pieces. The vehicle 1 also has an engine unit 6 below the seat 5.

[0022]

The body frame 2 has a power transmission device 11 that distributes the power from the engine unit 6 to front and rear drive shafts 7, 8 and transmits the power to the front and rear wheels 3, 4 through front and rear differentials 9 and 10. The body frame 2 also has a steering device 13 that transmits a rotational movement of a steering wheel 12 which is disposed in front of the seat 5. The body frame 2 further has front and rear suspension devices 14, 15 that suspend the respective right and left front and rear wheels 3, 4 such that those wheels 3, 4 can independently swing up and down. In addition, a hood 16 is arranged in a front area of the body frame 2 to have open and closed positions, and a carrier 17 is arranged behind the seat 5.

[0023]

The body frame 2 is provided with comprises a main frame 20, a front frame 21, a rear frame 22 and pillar frames 24, 24. The main frame 20 is provided with right and left side members 18, 18 and cross members 19 that couple respective front, center and rear portions of the side members 18, 18. The front frame 21 stands on a front portion of the main frame 20, and the rear frame 22 stands on a rear portion thereof. The pillar frames 24, 24 are disposed on right and left sides of the main frame 20 and form a vehicle compartment together with a floor panel 23.

[0024]

The floor panel 23 is disposed between the front frame 21 and the rear frame 22 to bridge the right and left pillar frames 24, 24.

[0025]

A dashboard 25 is placed at a compartment side of the front

frame 21. A meter unit 26 is disposed at a center portion in a transverse direction of the frame 2 to indicate the speed, the fuel balance and the like of the vehicle 1. Because the meter unit 26 is transversely placed, the driver does not need to move his or her eyes in a wide range, and the visibility can be improved, accordingly.

[0026]

The carrier 17 has a box shape that is a rectangular parallelepiped in the top plan view. Right and left bottoms 17a, 17a of the carrier 17 are positioned higher enough to avoid the rear wheels 4 to reach thereto even under the maximum stroke of the rear wheels 4. A center bottom 17b of the carrier 17 is stepped down so that the center bottom 17b is positioned lower than the right and left bottoms 17a, 17a. The center bottom 17b has a height front the ground that can be placed as low as possible, and therefore the entire bottom of the carrier 17 has a recessed shape in which the center bottom is lower than the right and left bottoms fore to aft.

[0027]

Because the center bottom 17b is positioned lower than the right and left bottoms 17a, heavier baggage can be placed there without the rear wheels 4 interfering the carrier 17. That is, the center of gravity is lowered enough, and the labor to load or unload the baggage can be decreased. In addition, for example, when the body inclines while the vehicle 1 turns, the step down portion 17c can prevent the baggage from moving transversely. The vehicle 1 thus can keep its stable position.

[0028]

Further, because the entire bottom of the carrier 17 has such a simple shape, i.e., the recessed shape in which the center

bottom is lower than the right and left bottoms fore to aft, the carrier 17 can be produced in reduced costs. Also, the stiffness of the entire carrier 17 can be improved.

[0029]

The seat 5 is divided into right and left pieces 31, 30. The right and left pieces 31, 30 are detachably arranged at a top and front portion of the rear frame 22 and are transversely spaced apart from each other. Each seat piece 31, 30 is provided with a seat cushion 31a, 30a that is detachably affixed to the rear frame 22 and a seatback 31b, 30b that is united with the seat cushion 31a, 30a, respectively. The steering wheel 12 is positioned in front of the left seat piece 30. Also, as shown in FIG. 5, an accelerator pedal 32 and a brake pedal 33 are arranged at a portion of the floor panel 23 in front of the left seat piece 30.

[0030]

The floor panel 23 is laid in front of both the right and left seat pieces 31, 30 to support feet of the respective riders seated in the respective seat pieces 31, 30 and also to function as a step when the riders get into and out of the vehicle 1. More specifically, the floor panel 23 has the following structure.

[0031]

Right and left side portions of the floor panel 23 in the transverse direction are leveled to form footrests 23a, 23b. A center portion of the panel 23 in the transverse direction, i.e., the portion that is positioned between the right and left seat pieces 31, 30, is swelled upward to form a floor tunnel 23c that extends in the fore to aft direction.

[0032]

As illustrated in FIG. 5, the floor tunnel 23c configures a trapezoid shape in the transverse cross-section with right and left walls 23d, 23d, which contiguously extend from the right and left footrests 23b, 23a and incline inwardly upwardly, and with a top wall 23e, which couples the top ends of the respective side walls 23d. The front drive shaft 7 extends through the floor tunnel 23c. In addition, a cooling water hose, an intake duct, a brake cable and the like also extend through the tunnel 23c.

[0033]

The left wall 23d is positioned to contact the heel of the driver when the driver sets his or her foot F on the accelerator pedal 32. Thus, the left wall 23d acts as a stop that prevents the heel of the driver from being moved away from the rest of the driver's body by the centrifugal force exerted while the vehicle 1 runs on the rough ground.

[0034]

According to the floor panel structure in the illustrated embodiment, because the floor tunnel 23c is projected in the center of the floor panel 23 in the transverse direction, and the left wall 23d of the floor tunnel 23c acts as a stop that prevents the heel of the driver from being moved in the transverse direction, the left wall 23d can prevent the foot of the driver from moving to the right direction when, for example, a large centrifugal force affects the foot due to a rapid turn of the vehicle 1. Accordingly, the driver can accurately operate the accelerator pedal 32 and can keep a stable driving position.

[0035]

Additionally, if the steering wheel is positioned in the right

hand side of the vehicle, the right wall 23d of the floor tunnel 23c can act as a stop that prevents the heel of the driver's left foot from moving to the left direction.

[0036]

Because the front drive shaft 7, the cooling water hose, the intake duct and the brake cable extend through the floor tunnel 23c, the right and left footrests 23a, 23b of the floor panel 23 can be lowered in keeping the front drive shaft and the others at each necessary height, and therefore the seat can be lowered enough. As a result, the riders can keep the most suitable riding positions.

[0037]

Next, a construction for mounting the engine unit 6 is described.

[0038]

The engine unit 6 comprises a water-cooled, four-stroke, single-cylinder engine 35, and a transmission case 38 that is coupled to a front portion of the engine 35 and includes a crankcase 37a enclosing a crankshaft 37 and a belt case 36a enclosing a V belt type continuously variable transmission 36. The engine 35 has a structure that includes the crankcase 37a that encloses the crankshaft 37 transversely and horizontally extending, and a cylinder block 35b, a cylinder head 35c and a head cover 35d those of which are integrated and coupled to the crankcase 37a. A front wall 35e of the cylinder head 35c has an intake port 35f, and a rear wall 35g thereof has a pair of exhaust ports 35h.

[0039]

The belt case 36a is connected to a left wall of the crankcase 37a, and encloses the V-belt type continuously variable

transmission 36. The continuously variable transmission 36 is constructed to include: a drive pulley 36d attached to the crankshaft 37; a driven pulley 36b attached to an output shaft 39 that extends parallel to the crankshaft 37; and a V belt 36c wound around the drive pulley 36d and the driven pulley 36b. The engine output from the output shaft 39 is transmitted to the front and rear drive shafts 7, 8 through a high, low and forward, reverse switching mechanism (not shown) enclosed within the crankcase 37a, and a bevel gear mechanism 40. A rear wall of the belt case 36a has an air inlet 36e through which air for cooling is introduced, and a front wall thereof has an air outlet 36f through which the air is discharged.

[0040]

The engine unit 6 is mounted onto the rear frame 22 such that the output shaft 39 is positioned in front of the crankshaft 37, the crankshaft 37 and the output shaft 39 are located below the seat 5, and a center line of the engine unit 6 extends between the right and left seat pieces 31, 30 and is centrally positioned in the transverse direction relative to the vehicle body.

[0041]

The major part of both the cylinder block 35b and the cylinder head 35c of the engine 35 is placed in the rear of the respective rear ends of the seatbacks 31b, 30b of the right and left seats 31, 30 in the left side view of the vehicle. Also, a cylinder axis A slants upward approximately 45 degrees relative to, for example, a horizontal line.

[0042]

An air intake device 45 extending forward relative to the vehicle body is connected to the front wall 35e, while an

exhaust device 46 extending rearward relative to the vehicle body is connected to the rear wall 35g. The exhaust device 46 comprises a pair of exhaust pipes 47, 47 which are coupled to the rear wall 35g to be in communication with the respective exhaust ports 35h, and an exhaust muffler 48 which is coupled to each downstream end of the exhaust pipes 47. Each exhaust pipe 47 has a wavy shape that serpentines up and down in the side view. The muffler 48 is disposed around a rear end of the body frame 2 to transversely extend.

[0043]

The intake device 45 is constructed such that a downstream end of the throttle body 50, which forms a fuel supply device, is coupled to the front wall 35e through an intake pipe 49 to be connected to the intake port 35f, a down stream end of the intake duct 51 is coupled to a upstream end of the throttle body 50 through an accumulator 53, and an air cleaner 52 is coupled to the upstream end of the intake duct 51.

[0044]

The throttle body 50 has a throttle valve 50a that opens and closes an intake passage. The accelerator pedal 32 is connected to the throttle valve 50a through a throttle control cable. The air cleaner 52 is disposed in the rear and the proximity of the hood 16 between the right and left front wheels 3. Fuel is supplied to the throttle body 50 from a fuel (not shown). Additionally, another construction for directly injecting fuel to the induction system can be used as the fuel supply device.

[0045]

The intake duct 51 includes a vertical section 51a that extends generally vertically downward from the air cleaner 52, a horizontal section 51b that extends from a bottom end of the

vertical section 51a generally toward a forward end of the seat 5 through the floor tunnel 23 of the floor panel 23, and a rising section 51c that extends generally vertically along a forward surface of the rear frame 22 from the horizontal section 51b. A top end of the rising section 51c and the upstream end of the throttle body 50 are coupled with each other through the accumulator 53 that has larger than a cross-section area of the intake duct 51.

[0046]

The engine 35 is arranged such that the front wall 35e of the cylinder head 35c is positioned between the right and left seat pieces 31, 30 and is directed obliquely upward and forward. Thus, inevitably, the rear wall 35g is directed obliquely downward and rearward.

[0047]

A shift lever 42 is disposed at a front end of a space generally formed between the right and left seat pieces 31, 30. The shift lever 42 is used to change the shift positions among parking, forward H-N-L and reverse positions. The shift lever 42 is positioned above and in the proximity of the transmission case 38 of the engine unit 6. The shift lever 42 and the foregoing change mechanism are connected with each other through a linkage mechanism.

[0048]

According to the engine unit mounting structure in the illustrated embodiment, because the engine unit 6 is mounted such that the output shaft 39 and the crankshaft 37 are positioned below the seat 5, the cylinder head 35c is inevitably directed rearward. The engine unit 6 thus can be mounted onto the body frame 2 with a small rearward protrusion of the engine

unit 6 without interfering the seat 5 or the feet of the riders. As a result, the wheelbase can be shortened, to thereby the vehicle body can be compact.

[0049]

Also, because the cylinder head 35c is directed rearward, the engine heat is inhibited from affecting the riders. Hence, the riders can directly change seats between the right and left seat pieces 31, 30.

[0050]

In the illustrated embodiment, a certain part of the cylinder block 35b and the cylinder head 35c projects rearward than the rear end of the seatback 30b, 31b, and the cylinder axis A inclines upward and rearward. Thus, the cylinder block 35b and the cylinder head 35c both having much heat can be spaced apart from the riders, and the influence of the engine heat to the riders can be therefore avoided.

[0051]

Also, the intake device 45 that extends forward is connected to the front wall 35e of the cylinder head 35b positioned between the right and left seat pieces 31, 30, while the exhaust device 46 that extends rearward is connected to the rear wall 35g of the cylinder head 35b. Because of this construction, the engine heat is prevented from affecting the intake system and therefore a stable engine output can be assured. Also, the engine heat can be discharged rearward relative to the vehicle body, the exhaust system can be spaced apart from the fuel supply system. In these standpoints, the influence by the engine heat can be avoided.

[0052]

In the illustrated embodiment, the throttle body 50 is

disposed between the right and left seat pieces 31, 30, and the intake duct 51 that is coupled with the throttle body 50 extends forward between the right and left seat pieces 31, 30 to be connected to the air cleaner 52. Thus, the water invasion into the throttle body 50 and the obstacle collision can be avoided. Further, the empty space between the right and left seat pieces 30, 31 can be effectively used to arrange the components of the intake system.

[0053]

Also, because the shift lever 42 is positioned in the proximity of the change mechanism of the engine unit 6 between the right and left seat pieces 31, 30, the linkage mechanism that connects the shift lever 42 and the change mechanism can be compact, and the structure thereof can be simple. Further, the operation feeling of the shift lever 42 can be improved.

[0054]

According to the intake device in the illustrated embodiment, because the intake port 35f of the engine 35 is positioned to be open upward between the right and left seat pieces 31, 30 and the throttle body 50 also is positioned therebetween, the exhaust ports 35h inevitably is positioned to be open downward opposite to the intake port 35f. Hence, the exhaust pipes 47 can be spaced apart from the riders, and the heat of the exhaust gases can be inhibited from affecting the riders. As a result, the distance between the right and left seat pieces 31, 30 can be narrowed, and the vehicle body can be smaller.

[0055]

In the illustrated embodiment, the intake duct 51 comprises the vertical section 51a that extends downward from the air cleaner 52, the horizontal section 51b that extends from the

vertical section 51a toward the seat 5 through the floor tunnel 23 of the floor panel 23, and the rising section 51c that extends upward from the horizontal section 51b. Because of this construction, the intake temperature can be inhibited from being raised by the engine heat, and the influence by the heat to the intake duct 51 can be avoided.

[0056]

Also, because the intake duct 51 and the upstream end of the throttle body 50 are coupled with each other, the intake efficiency can be improved.

[0057]

In the illustrated embodiment, the air cleaner 52 is positioned in the rear and the proximity of the hood 16. Thus, the engine heat is inhibited from affecting the air cleaner 52. In addition, the water invasion into the air cleaner 52 also can be avoided.

[0058]

Next, the steering device 13 is described. The steering device 13 connects a steering shaft 55 that is coupled with the steering wheel 12 to tie rods (not shown) that are coupled with the right and left front wheels 3, 3 through a rack and pinion mechanism 56. The rack and pinion mechanism 56 changes a rotational movement of the steering shaft 55 to a movement of the tie rods in the transverse direction relative to the vehicle body.

[0059]

The steering shaft 55 is constructed to connect an upper shaft 55a that extends obliquely downward and forward from the steering wheel 12 with a lower shaft 55b that extends generally toward a center portion in the transverse direction from a

bottom end of the upper shaft 55a via a universal joint (not shown). Also, the rack and pinion mechanism 56 is enclosed within a gear box 57.

[0060]

The front differential 9 has a structure in which a differential case 60 encloses a differential gear mechanism (not shown) that distributes the engine power between the right and left axles 9a. The differential case 60 is affixed to a front end portion of the main frame 20 between the right and left side members 18.

[0061]

A top surface of the differential case 60 has a mounting seat 60a onto which the gear box 57 is affixed. The gear box 57 has a mounting piece 57a that is previously unitarily formed with the gear box 57. The gear box 57 is affixed to the differential case 60 with the mounting piece 57a joined to the mounting seat 60a by bolts 58.

[0062]

According to the steering device 13 in the illustrated embodiment, because the differential case 60 is affixed to the main frame 20 and the gear box 57 is affixed to the differential case 60 by bolts, the gear box 57 can be coupled with the differential case 60 that has sufficient stiffness. The structure of the steering device 13 can bring in variance of layout of the suspensions and therefore the structure can reduce toe angle changes of the right and left front wheels 3, 3 due to bump steering.

[0063]

Also, the differential case 60 has the mounting seat 60a and the mounting piece 57a of the gear box 57 is affixed to the

mounting seat 60a. That is, the mounting piece 57a that has been previously formed can be used without any change thereof. The gear box 57 can be united with the differential case 60 by such a simple structure in which the mounting seat 60a is merely formed at the differential case 60.

[0064]

Additionally, it has been described in the illustrated embodiment that the gear box 57 and the differential case 60 are separately formed from one another and they are united together by the bolts; however, the gear box and the differential case can be unitarily formed with each other.

[Brief Description of the Drawings]

FIG. 1 is a side view of an all-terrain vehicle to explain an embodiment of the present invention.

FIG. 2 is a top plan view of the all-terrain vehicle.

FIG. 3 is a side view of an engine unit that is mounted on the all-terrain vehicle.

FIG. 4 is a side view of a steering device of the all-terrain vehicle.

FIG. 5 is a cross-sectional view of a floor panel of the all-terrain vehicle.

FIG. 6 is a cross-sectional view of a carrier of the all-terrain vehicle.

[Description of Reference Numerals and Symbols]

1: all-terrain vehicle

2: body frame

3: front wheel

4: rear wheel

5: seat

6: engine unit

30: left seat piece

31: right seat piece

35: engine

35a: crankcase

35b: cylinder block

35c: cylinder head

35e: front wall

35g: rear wall

36: V-belt type continuously variable transmission

37: crankshaft

38: transmission case

39: output shaft

42: shift lever

45: intake device

46: exhaust device

50: throttle body (fuel supply device)

51: intake duct

52: air cleaner